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# Human Capital and Organizational Performance Based on Organizational Innovation: Empirical Study on China

Yanfeng JIANG<sup>1</sup>, Yanfang JIANG<sup>2</sup>, Wan NAKAMURA<sup>3</sup>

## Abstract

It is now entering the knowledge-based economic era globally. In the new era, the real dominant resources and decisive production factors are not capital, land, or labor, but knowledge. In such an era, knowledge workers play critical roles in the business activity. Employees with knowledge would become the human capital of a company. High-tech industry has got in the giant competition era. Under the global competition and the constant innovation of knowledge-based economy, it becomes a worth discussing issue for high-tech businesses maintaining or enhancing the firm competitiveness. Aiming at high-tech industry, the supervisors and employees of high-tech businesses in Shanghai are distributed 420 copies of questionnaire. Total 322 valid copies are retrieved, with the retrieval rate 77%. The research results show significantly positive effects of 1.human capital on organizational innovation, 2.organizational innovation on organizational performance, and 3.human capital on organizational performance. According to the results, suggestions are proposed, expecting to help high-tech businesses, when encountering the challenge in the industrial environment, create more performance and benefits to achieve the sustained-yield management.

*Keywords:* human capital, organizational innovation, organizational performance, high-tech industry.

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## **Introduction**

It entered the knowledge-based economic era globally by the end of 20<sup>th</sup> century. The real dominant resources and decisive production factors in the new era are not capital, land, or labor, but knowledge. Knowledge workers play critical roles in business activity in the era. Employees with knowledge become the human capital of a company. Among the compositions of knowledge-based economy, the major source of enterprise value has transferred from tangible assets and capital to intangible human capital. Human capital is regarded as the asset with the most uniqueness and core value among all intangible assets. Manpower, as the heart, wisdom, and soul of an organization, is the sole action power of an organization as well as the primary motive for the organization making profits and the key factor in the business success of the organization.

In current knowledge-based economic era, traditional evaluation of an enterprise's business performance with the value of tangible assets seems not to satisfy the demands. An enterprise generally attracts and retains the customers with quality, date, cost, and service, which are regarded as the general ability and effort direction of all business managers. The importance of human capital is gradually discovered in enterprises. Research on the effect on and the correlation with firm performance is booming. The simplest definition of human capital contains "intangible assets" on balance sheets, e.g. patent right, customer base, and brand, which would be the key success factors in the long-term profitability and sustained-yield management of an enterprise and provide more considerations for a company making long- and short-term strategies. Along with rapid evolution of technology and economic globalization, high-tech businesses have to face problems affected by economic fluctuation as well as challenges of changing industrial environment. High-tech industry has got into the giant competition era that the growth of business scale and industrial cut throat could merely allow limit growth of an enterprise. High-tech enterprises have to constantly seek for innovation and growth to maintain the competitive advantages. In face of global competition and the innovation of knowledge-based economy, it is worth discussion to maintain or even enhance firm competitiveness of high-tech businesses. Aiming at the effect of human capital on organizational innovation and organizational performance, the empirical research expects to help high-tech businesses, when encountering challenges in the industrial environment, create more performance and benefits to achieve the sustained-yield management.

## Literature review

### *Human capital*

Chung & Park (2016) defined human capital as employees' attitudes, including the assumption, tendency, value, and belief. Pavlov *et al.* (2017) considered that human capital covered all knowledge, experience, ability, and technology of employees and managers in a company. Ahmad & Zabri (2016) regarded human capital as the ability of a company applying all employees' knowledge to solve business problems. Martin-de Castro, Amores-Salvado, & Navas-Lopez (2016) pointed out human capital as employees' ability, skills, and intelligence. Barlow (2016) referred human capital as organizational employees' experience, professional skills, and innovation ability. Sridharan & Joshi (2018) defined human capital as the set of knowledge, skills, ability, and organizational employees' ability. Deswanto & Siregar (2018) defined human capital as general and special human resources; the former referred to general workers, while the latter indicated professional manpower with special industrial knowledge and entrepreneurial human capital with previous entrepreneurship experience. Kuncova, Hedija, & Fiala (2016) considered that human capital should contain general human capital and special human capital; the former referred to personal traits, work experience, and education, while the latter indicated industrial human capital (knowledge, skills, and experience related to special industries) and entrepreneurial human capital (previous entrepreneurship experience).

### *Organizational innovation*

Chen, Lee, & Xu (2017) regarded innovation as a new ability to create wealth with resources and discussed innovation with complete and systematic forms. They opposed that innovation was an "inspired" idea, but could be trained and learned. Solakoglu & Demir (2016) proposed that innovation might be a new product, a new service, a new technology, or a new management method. Akansu *et al.* (2017) considered that invention was the process to discover new technology, while innovation was the process to transform invention into commercialization. Martinez *et al.* (2017) indicated that innovation required better ideas and stressed on the process to apply such ideas. Bashir & Long (2015) divided innovation into technology innovation and management innovation. Technology innovation included service, product, or process innovation, while management innovation covered the innovation of organizational structure and management. Williams, Martinez-Perez, & Kedir (2016) mentioned that innovation ability relied on an organization being able to well utilize external knowledge to present stronger competitiveness, through internal and external integration, than the competitors. Francis & Lublin (2017) pointed out the diverse organizational innovation of product innovation, organization innovation, technology innovation, and

service innovation; the real innovation ability could merely be presented by the comprehensive considerations. Innovation was a new idea or behavior for an organization that it was not necessary to be technological or specific, but simply to create new value with existing resources or to generate a useful result, output, and process.

### *Organizational performance*

Lin *et al.* (2018) regarded performance as a manager achieving the work goals at the position. Research pointed out performance as the degree of an employee fulfilling the task, revealing the fulfillment of work requirements; job performance referred to the net effect of an employee's efforts, which were affected by the ability and perceived role. Autor *et al.* (2015) indicated that "performance" was the measurement of the achievement of organizational goals, applying indicators and measuring methods to present the achievement of a plan on the mission, goal, and objective. Organizational performance measured the achievement of an enterprise's strategic goal and inspected the overall competitiveness of the enterprise. Patel *et al.* (2018) proposed that organizational performance was the output-input ratio of an enterprise in the entire operation and the achievement of various goals as well as the satisfaction of each participant in the. Bendickson, Gur, & Taylor (2018) contained effectiveness, efficiency, and participant satisfaction in performance. Performance presented the operation results of participants that performance should be evaluated before performance management. Goesaert, Heinz, & Vanormelingen (2015) considered that performance evaluation was similar to physical examination of an organization to evaluate the quality of the organization and the goal achievement for finding out problems earlier and adopting coping measures. The performance evaluation results were also the beneficial reference for an organization engaging in operation activity and resource allocation as well as revising management strategies and planning future directions.

### *Research hypothesis*

Lin *et al.* (2017) concluded that the more intensive human capital of an enterprise, the high value-added work would be higher so that the employees could not be replaced. The richer human capital was accumulated to enhance the output of human capital, the organizational innovation ability would be enhanced that firm competitiveness would be stronger. A company with higher revenue and profits would present stronger competitiveness because it would be more difficult for the competitors finding out competitive technicians than substituting such employees. Bos, Faems, & Noseleit (2017) indicated that the evaluation of human capital should confirm the gap between knowledge, technology, ability and future demands of the organization and the execution strategies to acquire the inadequate knowledge, technology, and ability. Apparently, human capital and

organizational innovationability appeared great correlations with “people”. Human capital presented absolute effects on organizational innovation. An enterprise being able to effectively execute human capital was the key to strengthen the organizational innovationability; there were absolute correlations between the two. Sridharan & Joshi (2018) proposed that personnel and management as well as personnel allocation were the sole and persistent competitive advantages; other advantages, such as technology, global reach, and information systems, could be imitated by competitors. Accordingly, Grillitsch & Nilsson (2017) proposed that an enterprise had to combine human resource management with the strategies, as the strategic human resource management, to develop human resource practice beneficial to the organizational innovation and assist in the generation of new ideas and organizational innovation activity. The following hypothesis is therefore proposed in this study.

*H1: Human capital reveals significantly positive effects on organizational innovation.*

Chen, Lee, & Xu (2017) indicated that the internal strength of an enterprise and the selection of strategies for innovation aimed to provide better products or service than the competitors in order to enhance the profitability and maintain better organizational performance. Ikhsan, Almahendra, & Budiarto (2017) pointed out organizational vision and strategies as the most important part in the promotion of organizational performance in the industry, revealing that the industry stressed the most on organizational vision and strategies to cultivate the innovation ability so as to acquire the organizational performance in the industry with constant research and development of innovative products. Francis & Lublin (2017) regarded organizational innovation as the source of organizational performance, meaning that organizational innovation was the combination of technology ability or knowledgeability, rather than the strong functions of products, presented flexible, adjustable or evolutionary functions, and was a unique resource in the value chain as well as the key success factor in an organization’s long-term sustained-yield management. For this reason, an organization, to cope with the changing environment, should keep constant innovation to evolve the core competitiveness and enhance the organizational performance. As a result, the following hypothesis is proposed in this study.

*H2: Organizational innovation shows remarkably positive effects on organizational performance.*

Lin *et al.* (2018) stated that human capital of an organization, under the knowledge-based economic environment, input new ideas and technology into the products, technology, service, and management to create new value and promote organizational performance and competitiveness. Ismail & Gali (2017) indicated that some resources would benefit the development and decision making

of company to further acquire competitive advantages and further proposed that human resources should conform to the characteristics of (1) value, (2) rareness, (3) fully inimitability, and (4) irreplaceability. Patel *et al.* (2018) explained that an enterprise being able to acquire resources with above characteristics would present competitive advantages and enhance the organizational performance. Human capital was regarded as the most important asset and was the major method for an enterprise enhancing the product quality and professional skills. The so-called human capital contained the establishment years of an organization as well as employees' working experience and education attainment. The following hypothesis is therefore proposed in this study.

*H3: Human capital presents notably positive effects on organizational performance.*

## **Research methodology**

### *I. Operational definition and measurement of variable*

(1) Human capital. Referring to Lin *et al.* (2017), human capital in this study contains three dimensions: (a) *Competency*: including knowledge and technology; (b) *Attitudes*: containing motivation, behavior, and guidance; (c) *Smart agility*: covering innovation, imitation, adjustment, and support.

(2) Organizational innovation. Referring to Chen, Lee, & Xu (2017), service innovation, management innovation, and R&D innovation are used for discussing organizational innovation ability in this study: (a) *Service innovation*: Abstract concepts about service methods and social image; (b) *Management innovation*: Aiming at organization, employment, leadership, control, and planning; (c) *R&D innovation*: Aiming to seek for breakthrough on products, technology, and process.

(3) *Organizational performance*. Referring to Lin *et al.* (2018), organizational performance covers the following dimensions: (a) *Job satisfaction*: Job satisfaction is employees' subjective satisfaction with work psychologically and physiologically as well as employees' preference to the work that job satisfaction is generated when the job characteristics are suitable for the workers' expectation; (b) *Organizational goal*: A goal is the standard achieved in a job or program as well as a correct, specific, and reasonable benchmark driven by inner motive; (c) *Job performance*: Job performance refers to the "quality and quantity" performed by an individual or a group to achieve the task as well as individual behavior, being a participant, to complete the formal role expected, regulated, and demanded by the organization.

*Research object*

Aiming at high-tech industry, the supervisors and employees of high-tech businesses in Shanghai are distributed 420 copies of questionnaire in this study. Total 322 valid copies are retrieved, with the retrieval rate 77%.

*Reliability and validity analysis test*

The reliability of the dimensions in this study achieve above 0.7, revealing high reliability of the dimensions. The construct validity of the scale in this study is analyzed with confirmatory factor analysis. *Table 1* shows good convergent validity and construct validity of the research scale.

*Table 1: Confirmatory factor*

research dimension	overall fit	analysis result
human capital	X <sup>2</sup> =0(P<0.001); DF=0; GFI=1.00; CFI=1.00	excellent overall model fit
organizational innovation	X <sup>2</sup> =0(P<0.001); DF=0; GFI=1.00; CFI=1.00	excellent overall model fit
organizational performance	X <sup>2</sup> =0(P<0.001); DF=0; GFI=1.00; CFI=1.00	excellent overall model fit

**Results**

*Correlation analysis*

From *Table 2*, human capital appears significant correlations with organizational innovation and organizational performance. The result reveals the possibility of multicollinearity of the dimensions that nested model is used for solving the problem. The remarkable correlations among research dimensions also reveal the consistency with research hypotheses.

*Table 2: Correlation analysis*

research dimension	α	human capital	organizational innovation	organizational performance
human capital	0.85			
organizational innovation	0.87	0.25**		
organizational performance	0.91	0.28**	0.31**	



**Overall model discussion**

Regarding the overall model fit, Table 3, the overall model fit standards  $\chi^2/Df=1.545$ , smaller than the standard 3, and  $RMR=0.008$  show the proper results of  $\chi^2/DF$  and  $RMR$ . Furthermore, chi-square value presents extreme sensitivity to sample size that it is not suitable for directly judging the fit. However, the overall model fit standards  $GFI=0.981$  and  $AGFI=0.934$  achieve the standard 0.9 (the closer  $GFI$  and  $AGFI$  to 1 revealing the better model fit) that this model shows favorable goodness-of-fit.

Table 3: Overall linear structural model analysis

overall fit	$\chi^2/Df$	1.545
	GFI	0.981
	AGFI	0.934
	RMR	0.008

Note: \* stands for  $p<0.05$ , \*\* for  $p<0.01$ , and \*\*\* for  $p<0.001$ .

*Research hypothesis discussion*

With nested model, chi-square test is used for testing the research hypotheses, as each nested model appears a degree of freedom. When the difference in chi-square value between the nested model and the theoretical model achieves the significance, the path coefficient being set 0 is significant. The research result shows the significance of the model. The nested model analysis results are shown in Table 4, and the hypothesis test results are listed in Table 5.

Table 4: Nested model analysis

model	$\chi^2$	$\Delta\chi^2$	GFI	CFI	RMSEA
theoretical model	241.32		0.981	0.966	0.09
Model 1: hypothesis test	244.76	3.44*	0.981	0.966	0.09
Model 2: hypothesis test	249.88	5.12*	0.981	0.966	0.09
Model 3: hypothesis test	256.26	6.38*	0.981	0.966	0.09

Table 5: Hypothesis test

research hypothesis	correlation	empirical result	P	result
H1	+	0.289	0.00	supported
H2	+	0.332	0.00	supported
H3	+	0.361	0.00	supported

## Conclusion

The research results reveal that the fiercely competitive high-tech businesses, with unchanged personnel quality and environment facilities, could enhance the effective organizational innovationability by effectively executing human capital. It is realized that human capital would affect the investment in manpower, organizational performance would be influenced by manpower involvement, and the benefit from organizational innovation would also affect organizational performance. A high-tech business therefore has to change with external environment, adjust the strategy direction, and utilize human capital for making up the inadequate technology and ability. To promote the organizational performance in the industry, a high-tech business has to develop the effectiveness of human capital and organizational innovation to further win the competitive advantages. A high-tech business should change with the time; starting from consumers, the innovation is effectively applied to work practice, to cultivate innovative thinking and flexible professional skills, to develop new processes and products, to break through the market and seek for a new blue ocean, and to rapidly introduce product, technology, business model, and service innovation to transfer opportunities into practicable business models.

## Suggestions

According to the research results and findings, practical suggestions are further proposed in this section.

(1) Knowledge management strategies could effectively enhance high-tech employees' human capital that a company should construct complete knowledge management systems, e.g. systematic integration of written documents, establishment of work communities or forums, and provision of information exchange platform.

(2) When constructing the recruitment channel, a high-tech business would apply information technology, expand the sources of applicants, and establish the talent database so as to acquire high-quality and suitable talents from numerous applicants. During the recruitment, a high-tech business could utilize various testing tools to ensure the recruited employees conforming to the requirement for high-tech industry.

(3) A high-tech business should establish complete education and training plans, provide different types of training opportunities, and real-time impart

new knowledge and new thoughts. Furthermore, human capital strategies would present certain effects on the successor plan of a company, as a high-tech business would provide a series of training and development plans for supervisors who might be introduced to the leadership level. In this case, the “candidates” would enhance the value of human capital and promote self-competitiveness; and, the employees would be increased the development opportunities, e.g. promotion or learning new skills.

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